Improving COPD Management at Transitions of Care

Alan Kaplan, MD, CCFP(EM) FCFP CPC(HC)

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KEY TAKEAWAYS

- Chronic obstructive pulmonary disease (COPD) remains a substantial cause of morbidity and mortality in the United States.
- Patients with COPD are more likely to have cardiovascular disease (CVD) than those without COPD, and cardiopulmonary events are the most common reason for death.
- Notable updates in the 2024 Global Initiative for Chronic Obstructive Lung Disease (GOLD) report include additional information on hyperinflation, leveraging lung cancer screening to assess for COPD, the role of blood eosinophil count, choice of inhaler device, and pharmacotherapy for smoking cessation.
- Optimizing transitional care management post-hospitalization or post-emergency department discharge for patients with COPD is essential and should include cardiopulmonary risk evaluation including both future respiratory exacerbation and CVD risk, recognizing that future exacerbations and hospitalizations are more likely after an episode.
- Primary care clinicians (PCCs) can work with a multidisciplinary team and support staff to develop approaches to transitional care that enhance overall patient care and treatment outcomes.

FACULTY

Alan Kaplan, MD, CCFP(EM) FCFP CPC(HC), Chair, Family Physician Airways Group of Canada; Vice President, Respiratory Effectiveness Group; Primary Care Cancer Lead, Central Region, Cancer Care Ontario.

DISCLOSURES

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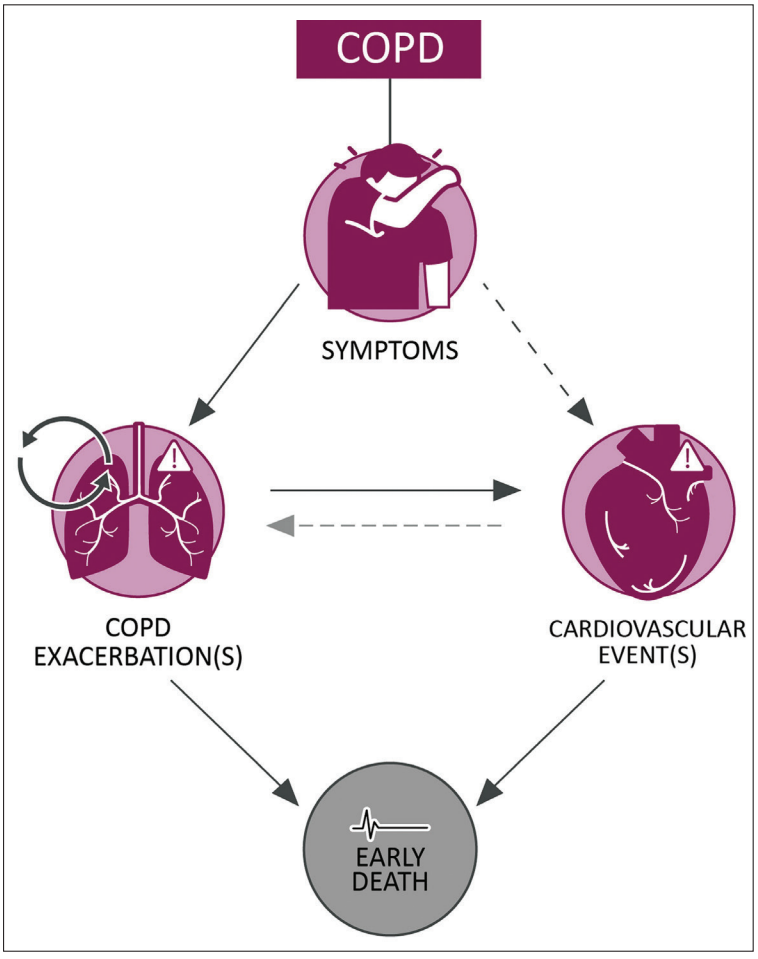
INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common disease worldwide and in the United States that causes significant morbidity and mortality.[1,2] As of 2021, COPD was the sixth leading cause of death in the US and accounted for most of the deaths from chronic lower respiratory diseases.[3] Mechanisms of COPD and exacerbations increase the risk for both pulmonary and cardiovascular (CV) events (cardiopulmonary risk).[4-6] A proposed definition of cardiopulmonary risk is "the risk for serious respiratory and/or CV events in patients with COPD. These include, but are not limited to, COPD exacerbations, myocardial infarction, stroke, heart failure decompensation, arrhythmia, and death due to any of these events" (**FIGURE 1**).[7] Cardiopulmonary causes are the most common reasons for death in patients with COPD and can lead to early death.[8,9] In addition to patient morbidity, costs and healthcare utilization are significant impacts of COPD.

Costs of COPD in the US increased 72% from 2000 to 2018 and are estimated at approximately $24 billion each year among adults 45 years of age and older, including $11.9 billion in prescription drug costs, $6.3 billion in inpatient costs, $2.4 billion in office-based costs, $1.6 billion in home health costs, $900 million in emergency department (ED) costs, and $800 million in outpatient costs.[10] The average annual cost per patient per year is estimated at $4,322.[10] Hospitalizations and ED visit rates for COPD remain high, although rates decreased from 2016 to 2020, driven significantly by the COVID-19 pandemic, which led to avoidance of healthcare facilities and limited capacity in these institutions.[10] In 2020, there were 335,000 hospitalizations for COPD in the US (101.3 per 100,000 population) and 925,000 ED visits (279.1 per 100,000 population).[10]

Results of a recent US cross-sectional study indicate that adults living with COPD were more likely to be unemployed than those without COPD (56.2% vs 45.3%), were unable to work due to illness or disability (30.1% vs 12.1%), and had difficulty paying bills (16.1% vs 8.8%).[11] Additionally, those with COPD reported worse perceived health (36.2% vs 14.4%), missed more work days because of illness or injury per year (median, 2.5 days vs 0.0 days), and had limitations in physical function (40.1% vs 19.4%). Adults who self-reported as Black were more likely to have CV-risk conditions, worse socioeconomic and health-related quality of life outcomes, and higher healthcare expenses than those who self-reported as White or of other races.[11]

FIGURE 1. COPD-associated cardiopulmonary risk.



Arrow type and shade indicate strength of association: strong association, with substantial supporting data (dark grey solid); emerging association, with some supporting data (dark grey dotted); suspected association, with data yet to be generated (light grey dotted).

Source: Singh D, et al. Implications of cardiopulmonary risk for the management of COPD: a narrative review. *Adv Ther*. 2024;41(6):2151-2167. No changes were made to the figure prior to reprinting. Figure licensed under a Creative Commons Attribution-Noncommercial 4.0 International License, which permits any non-commercial use, sharing, adaptation, distribution, and reproduction. The license can be viewed at this link: https://creativecommons.org/licenses/by-nc/4.0/legalcode

Risk for morbidity and mortality from COPD is particularly pronounced surrounding transitions of care, which are defined by the Centers for Medicare & Medicaid Services (CMS) as "the movement of a patient from one setting of care (hospital, ambulatory primary care practice, ambulatory specialty care practice, long-term care, home health, rehabilitation facility) to another."[12,13] Data suggest that implementing transitions of care best practices can optimize COPD care and lead to lower readmission rates.[12,14]

Because approximately 80% of patients with COPD are managed in the primary care setting, primary care clinicians (PCCs) play a major role in managing COPD, including maximizing quality of life, addressing CV risk, preventing and treating exacerbations, and ensuring adequate intervention at care transitions.[15,16] Specific tasks performed at transitions of care (after hospital or ED discharge) by PCCs or other office staff include a follow-up, post-discharge visit, medication reconciliation, and multidisciplinary team coordination, including referrals to a specialist when needed.[15,17]

CASE SCENARIO

A 62-year-old man with COPD is admitted to the hospital with difficulty breathing due to an infectious exacerbation of his COPD, and with treatment, his status improves during the course of his stay. He starts with prednisone and antibiotics, and his long-acting muscarinic antagonist (LAMA) inhaler is intensified to a long-acting beta agonist (LABA) + LAMA + inhaled corticosteroid (ICS) inhaler, based on his high risk for recurrent exacerbation. He is discharged with a prescription for a LABA + LAMA + ICS inhaler that is not covered by insurance. At a post-discharge follow-up visit, the patient tells his PCC that he cannot afford the inhaler and has not picked it up yet. His overall management is complicated by a history of transient ischemic attack after a previous COPD exacerbation, though he did not experience any CV events during this most recent hospitalization.

The patient in the case scenario above is at increased cardiopulmonary risk due to his recent exacerbation and subsequent nonadherence to prescribed exacerbation prevention triple-inhaled therapy. During this transitional care visit, the PCC and other members of the care team should seek to reduce the patient's risk for mortality and other adverse outcomes, improve access to COPD and CV treatments, and reduce the risk for future exacerbations.

2024 GOLD REPORT UPDATES

The 2024 Global Initiative for Chronic Obstructive Lung Disease (GOLD) report includes a variety of updates, many of which are described below, that clinicians need to be aware of to remain updated on the best practices for COPD management. Additional key updates that are not reviewed in this article include information on preserved ratio impaired spirometry, clarification of the role of prebronchodilator spirometry, and interstitial lung abnormalities.[17]

Hyperinflation. A section on hyperinflation has been added. Hyperinflation is defined as increased gas volume in the lungs compared to normal values at the end of spontaneous expiration. It places additional strain on the heart by reducing preload and afterload and is common in patients

with COPD. Hyperinflation contributes to impaired exercise tolerance, dyspnea, increased risk for hospitalization, development of respiratory failure, and increased mortality.[17] Interventions that can improve hyperinflation include bronchodilators, supplemental oxygen, pulmonary rehabilitation, pursed lip breathing, inspiratory muscle training, sputum management, and lung reduction surgery (in certain cases of severe hyperinflation).

COPD identification and screening. Certain patients, such as those undergoing screening for lung cancer or investigation for lung abnormalities, can be screened using low-dose chest computed tomography (LDCT), leveraging this imaging to identify unrecognized symptoms of COPD and assess airflow limitation.[17] Additionally, the role of spirometry has been re-emphasized for diagnosis, assessment of severity of airflow obstruction for prognosis, and follow-up assessment including therapeutic decision-making and identification of rapid decline.[17] Of note, the GOLD report recommends case finding, or screening for symptoms, but not proactive, routine screening for COPD.[17]

Blood eosinophil count. The 2024 report further emphasizes the role of measuring blood eosinophils in patients with COPD. Blood eosinophil counts predict the magnitude of effect of ICS in preventing exacerbations and are recommended to guide use of ICS as a component of pharmacologic management of COPD.[17]

Choice of inhaler device. GOLD recognizes the differences in device size, portability, steps to prepare and inhale a dose, technique, and cleaning procedures between inhaler devices.[17] Patients who are correctly using their current inhaled therapy who undergo treatment adjustment have a better chance of correct use if the new therapy uses the same device. The ability to use inhaled devices correctly depends on cognitive ability, dexterity, coordination, inspiratory flow ability, experience with other inhaler devices, and previous education on inhaler technique.[17]

Pharmacotherapy for smoking cessation. Consistent with evidence of the benefit of pharmacologic interventions to increase the likelihood of successful smoking cessation, GOLD recognizes the effectiveness of interventions such as nicotine replacement therapy, bupropion, nortriptyline, and varenicline.[17]

Vaccine recommendations. Recommendations for vaccines in patients with COPD were updated to align with current guidance from the Centers for Disease Control and Prevention, and vaccine recommendations are reviewed briefly below.

CARDIOPULMONARY DISEASE AND COPD

The pathophysiology and treatment of cardiopulmonary disease are interrelated and affect overall health outcomes.[2,4,18-21] COPD increases the odds of having CV disease by a factor of 2.7, compared with patients without COPD.[22] A recent National Health and Nutrition Examination Survey population-based, cross-sectional study examined the prevalence of CV disease in patients with COPD using data from 2013-2018 in US adults aged 40 years and older.[23] The CV diseases considered were coronary heart disease, heart failure, angina pectoris, heart attack, diabetes, and stroke. Of 11,425 patients included, 661 had COPD and 10,764 did not. Patients with COPD had a significantly higher prevalence of CV disease (59.6%) than those without COPD (28.4%). After adjustment for covariates, COPD was significantly associated with the prevalence of 1 (odds ratio [OR], 2.2; $P<.001$), ≥2 (OR, 3.3; $P<.001$), and ≥3 (OR, 4.3; $P<.001$) CV diseases.[23]

Patients with cardiopulmonary disease experience worse cardiac outcomes than those without COPD, as major adverse CV events are more likely after an acute COPD exacerbation, and CV events are one of the most common causes of death in patients with COPD.[8,9,17] CV risk can remain elevated for up to 1 year following a COPD exacerbation, and as few as 1 severe COPD exacerbation can double the risk for heart attack and increase the risk for hospitalization and cardiopulmonary-related death.[24-29]

Suggested pathophysiologic mechanisms for cardiopulmonary disease include physiologic links between COPD and CV disease, such as dyspnea, hypoxemia, hyperinflation, and systemic inflammation.[4] Risk factors that contribute to cardiopulmonary disease include age, smoking, physical inactivity, unhealthy diet, air pollution, genetic background, and health conditions such as diabetes, hypertension, hyperlipidemia, and infections.[18,30]

Potential strategies to address cardiopulmonary disease associated with COPD include approaching COPD treatment as proactive (rather than reactive), appropriately initiating or escalating therapy to reach treatment goals, implementing triple-inhaled therapy (LAMA + LABA + ICS) for appropriate candidates, detecting and treating COPD earlier, and placing an increased focus on multidisciplinary management to treat COPD as a CV risk factor and manage CV risk appropriately.[7] This includes implementing interventions that reduce CV and all-cause mortality in COPD, such as smoking cessation, early initiation of pulmonary rehabilitation, and fixed-dose combination triple therapy.[7]

COPD EXACERBATION FOLLOW-UP AT TRANSITIONS OF CARE

Optimizing management of COPD at transitions of care to mitigate exacerbations is essential, as an initial hospitalization for a COPD exacerbation is associated with recurrent exacerbations and other factors leading to short-term readmission and increased all-cause mortality.[17] Hospital discharge bundles are often used to include key actions

intended to facilitate successful transition to outpatient care. Discharge criteria include the following[17]:

- Review of clinical and laboratory data
- Check maintenance therapy and patient understanding
- Reassess inhaler technique
- Ensure understanding of acute medication regimen (steroids/antibiotics)
- Assess need for continuing oxygen therapy, if applicable
- Provide management and follow-up plan for comorbidities
- Confirm follow-up arrangements for outpatient visits
- Stepping up therapies for COPD to help reduce the risk for further exacerbations
- Consider vaccination status for influenza, COVID, pneumonia, tetanus-pertussis, and respiratory syncytial virus (RSV)

Discharge instructions should also aim to prevent further exacerbations and should include recommendations that the patient participate in pulmonary rehabilitation, keep their scheduled follow-up visit, and receive recommended vaccines.[17] Pharmacotherapy considerations at discharge should include optimizing CV medications (if applicable) and considering COPD treatments that can reduce exacerbations such as triple therapy in a single inhaler.[17] Other preventive therapies such as roflumilast, azithromycin, mucolytic therapy, and an oscillating positive expiratory pressure device to help with mucus clearance may be considered based on patient characteristics.

Effective and early post-discharge follow-up is recommended to optimize transitions of care, regardless of any pre-discharge interventions. Early follow-up within 1 month following discharge is associated with fewer exacerbation-related readmissions and is recommended where possible.[31] Multiple patient-related factors may preclude early follow-up after hospitalization for COPD, including poor adherence to medical recommendations, limited social support, the presence of more severe disease, and limited access to medical care. Regardless of the reason, patients who do not receive early post-discharge follow-up have increased 90-day mortality.[17]

Components of a post-discharge follow-up might include a variety of actions, including evaluation of patients' understanding of treatment regimens, assessment of symptoms, and determining the status of relevant comorbidities, such as CV risk assessment.[17] Recommended actions during a short-term (1 to 4 weeks) and long-term (12 to 16 weeks) follow-up visit are similar, though at the short-term follow-up, patients' eligibility for pulmonary rehabilitation should be assessed, and at the long-term follow-up, spirometry should be conducted.[17] If not already in place, transitional care visits provide opportunities to place referrals to specialists, where needed. A more comprehensive "checklist" set of post-discharge follow-up actions has also been suggested (**TABLE 1**).[32]

Prevention of future exacerbations should also be addressed at post-discharge follow-up visits. Patients may be more motivated immediately following an episode to engage

TABLE 1. Example transitions of care COPD checklist for post-hospital discharge and chronic management.[32]

Post-hospital discharge follow-up
Pharmacologic considerations
☐ Provide medication reconciliation
☐ Apply GOLD treatment strategies/evidence-based treatment strategies
☐ Symptom assessment/strategy review
○ Action plan: importance of early symptom recognition
○ Review action plan
○ COPD assessment test (CAT)
Link: https://www.catestonline.org/patient-site-test-page-english.html
○ Modified British Medical Research Council (mMRC) questionnaire
Link: https://www.uptodate.com/contents/image?imageKey=PULM/86426
○ Symptom diary
☐ Provide continued patient education and counseling on role of long-term preventive and acute rescue medications
☐ Assess inhaler technique and concerns with inhaled medications
☐ Measure spirometry: forced expiratory volume in 1 second (FEV_1)
☐ Consider measuring peak inspiratory flow in those prescribed a dry powder inhaler
☐ Perform cognitive and functional assessment and relation to appropriate device use
☐ Assess for changes in delivery device/medication
☐ Manage comorbidities, including cardiopulmonary risk
☐ Ensure vaccinations are up to date
☐ Assess need for starting or continuing supplemental oxygen administration
Nonpharmacologic considerations
☐ Evaluate durable medical equipment care/concerns/issues
☐ Assess home healthcare needs and plan to start if necessary
☐ Address nutritional concerns
☐ Evaluate for smoking cessation/second-hand exposure avoidance
☐ Assess goals of care/advanced directives
☐ Apply Transitional Care Management Codes for Medicare patients (99495 and 99496)

CONTINUED ON NEXT PAGE

in interventions that can help prevent exacerbations. When determining the patient's treatment regimen at transitional care visits to reduce the risk for exacerbations, clinicians should consider the use of nonpharmacologic and pharmacologic therapies that reduce the frequency of COPD exacerbations.[17]

Real-world evidence for transitional care programs. Although transitional care is recommended for all patients with COPD who are hospitalized, data are mixed as to the impact of formalized transitional care programs on outcomes. A recent systematic review and meta-analysis examined 9 randomized trials across multiple countries (including the US) assessing the effects of transitional care programs on healthcare utilization and quality of life in patients with COPD.[14] There was no statistically significant difference observed in the number of hospital readmissions and ED visits due to COPD between patients who were enrolled in a transitional care program and those who were not. However, patients in transitional care programs had a lower risk for readmission (risk ratio, 0.68; 95% CI, 0.56-0.84; *P*=.0004) and a numerically higher respiratory-related quality of life (mean difference on St. George's Respiratory Questionnaire, –10.58, 95% CI, –26.48 to 5.33; *P*=.19.[14]

Another study describing pharmacist-led transitions of care service for underserved patients with COPD noted that a significant decrease in the composite outcome (180-day COPD-related hospitalizations and ED visits) was observed in the pharmacist intervention group compared with usual care (mean difference, 0.82; 95% CI, 0.05-1.60; *P*=.0364).[12] This was mostly driven by lower 30-day hospitalizations in the intervention group (mean difference, 0.15; 95% CI, 0.04-0.27; *P*=.0099).[12] An additional pharmacist-led transition of care service for patients admitted with a principal diagnosis of COPD resulted in a decrease in the 30-day readmission rate from 25% at baseline to a mean of 16.2% after implementation.[33]

If an institution were to develop or implement a transitional care program for patients with COPD, it would seem prudent to include the elements mentioned previously as recommended in the GOLD report, focusing on interventions supported by evidence.

Patient case scenario, revisited. In the patient case scenario presented previously, the primary care team should engage in the recommended post-discharge actions to prevent exacerbations and readmission to the hospital. The team might consider checking the patient's insurance coverage to determine if there is an alternative LABA + LAMA + ICS inhaler that would be covered and more affordable for the patient. If possible, the treatment should be prescribed in the same (or a similar) device so the patient is familiar with how to use it. The care team might also help the patient pursue other cost-savings options such as copay cards or patient assistance programs where

TABLE 1. (continued)

Chronic care management
Pharmacologic considerations
☐ Continue to monitor for any COPD exacerbations
☐ Apply GOLD treatment strategies/evidence-based treatment strategies
☐ Monitor for change in symptoms
☐ Provide continued patient education and counseling on role of long-acting and short-acting medications
☐ Review inhaler technique and assess for changes in delivery device/medication
☐ Consider measuring peak inspiratory flow in those prescribed a dry powder inhaler
☐ Perform cognitive and functional assessment and relation to appropriate device use
☐ Review all medications and provide medication reconciliation at each visit
☐ Review action plan
☐ Symptom and strategy review
○ CAT Link: https://www.catestonline.org/patient-site-test-page-english.html
○ mMRC questionnaire Link: https://www.uptodate.com/contents/image?imageKey=PULM/86426
☐ Assess inhaler technique at every visit
☐ Assess need for resting and exertional oxygen assessment
☐ Ensure vaccinations are up to date
☐ Screen for alpha-1 antitrypsin deficiency if not already done
☐ Screen as appropriate for lung cancer
☐ Bone density tests per guidelines
☐ Consider sleep study (screening tool for obstructive sleep apnea: https://www.fpagc.com/tools-resources)
Nonpharmacologic considerations
☐ Discuss and address medication access concerns/affordability issues
☐ Continue to evaluate durable medical equipment care/concerns
☐ Address caregiver concerns and provide education resources
☐ Address potential barriers to pulmonary rehabilitation
☐ Manage comorbidities that impact COPD, including cardiopulmonary risk
☐ Smoking cessation/second-hand exposure avoidance
☐ Promote physical activity
☐ Assess for advanced care planning

Adapted from: American Society of Health-Systems Pharmacists, 2023.[32]

applicable. Ensuring the patient receives and is adherent to the prescribed treatment will help reduce his risk for mortality and future exacerbations, in addition to other benefits from a thorough transitional care visit.

Additional considerations include ensuring the patient's understanding of the role of acute relievers vs maintenance medications; verifying adequate inhaler technique and medication delivery; considering the measurement of peak inspiratory flow when using dry powder inhalers; arranging pulmonary rehabilitation; reinforcing and supporting smoking cessation efforts; considering mucus clearance techniques (if there is a persistent cough and mucus); arranging vaccination for influenza, COVID, pneumococcal pneumonia, and RSV at the appropriate time of year; reviewing and treating comorbidities including CV risk; optimizing nutrition; assessing oxygenation at rest and with activity; and creating a COPD action plan for further exacerbations that includes prompt therapy initiation.

CONCLUSION

PCCs are urged to incorporate best practices for managing COPD into clinical practice, due to the essential role of primary care in improving outcomes in COPD. This includes recognizing the health burden of COPD and associated cardiopulmonary risk, employing optimal approaches for transitional care visits, and optimizing treatment through practice change initiatives. ●

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